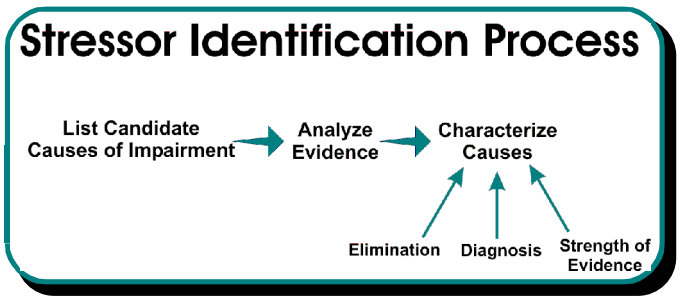
U.S. Environmental Protection Agency

The Stressor Identification Process

Identifying the Causes of Biological Impairments to Water Bodies

To restore and maintain the chemical, physical, and biological integrity of the Nation's waters, numerous States and Tribes are using biological assessments and biocriteria to identify water bodies that are biologically impaired. The Stressor Identification Guidance Document has been created to assist water quality experts in identifying unknown causes (stressors) of biological impairment through the use of a logical, scientific process by which they can evaluate available information. The document includes two case studies that have been developed to illustrate the principles and processes of the document. These case studies should enable States and Tribes to more easily perform a causal analysis themselves. Once the causes of the biological impairments are identified, water resource managers will be better able to locate the sources of the stressor, or stressors, and take management actions aimed at improving the biological condition of water bodies in which the fish, invertebrate, algae or plant communities, and other aquatic life have been detrimentally impacted.



The Stressor Identification Guidance Document provides a step-wise analytical process for use in determining the cause of an ecological impairment. Logic steps in the causal identification process were derived from the scientific literature, including the areas of eco-epidemiology, human epidemiology, forensics, symptomology, diagnosis, and general philosophy of science and inductive inference. The three main steps of the stressor identification process are (1) list candidate causes of impairment, (2) analyze the evidence, and (3) characterize the causes. The last step, characterizing the cause, evaluates the evidence in three steps: elimination, diagnosis, and strength of evidence. When evidence is adequate, investigators should be able to use this guidance to successfully identify the likely cause(s). This guidance will also help investigators identify where evidence is weak or lacking and needs to be developed to enable successful identification of the stressor(s).

Several avenues of research continue to build on the foundation established by the stressor identification process. A Causal Analysis, Diagnosis and Decision Information System (CADDIS) is being planned that will allow routine application of the process and put needed data and tools at the fingertips of resource managers.

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Benefits

- A logical, scientific process for use in identifying the causes of biological impairments to water bodies
- Case studies illustrate the principles and processes of the document
- Can be used by local, state, or federal water quality experts

Purpose

- The guidance document was published under the authority of Section 304(a)(2) of the Clean Water Act (CWA) and supports the EPA's goal of safe, clean water.

Milestones

- Development of the logic steps of the Stressor Identification Document
- Development of two case studies illustrating the principles and processes of the Stressor Identification Document
- Publication of the Stressor Identification Document under document number EPA-822-B-00-025 (the document is available on the Internet at http://www.epa.gov/OST/biocriteria)

Participants

- U.S. Environmental Protection Agency, Office of Research and Development and Office of Water
- Colorado State University, Fort Collins, Colorado
- Ohio Environmental Protection Agency
- Maine Department of Environmental Protection
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